

DERCUM (F.X.) & WHITE. (J.W.)

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SPINAL SURGERY.

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F. X. DERCUM, M.D.,

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J. WILLIAM WHITE, M.D.,

OF PHILADELPHIA.

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TWO CASES OF SPINAL SURGERY.

By F. X. DERCUM, M.D.,

OF PHILADELPHIA,

INSTRUCTOR IN NERVOUS DISEASES, UNIVERSITY OF PENNSYLVANIA, NEUROLOGIST
TO THE PHILADELPHIA HOSPITAL.

AND

J. WILLIAM WHITE, M.D.,

PROFESSOR OF CLINICAL SURGERY, UNIVERSITY OF PENNSYLVANIA, SURGEON TO THE
UNIVERSITY; PHILADELPHIA AND GERMAN HOSPITALS.

NEUROLOGICAL MEMORANDA BY DR. DERCUM.

CASE I.—C. K., æt. 55 years, a cigar maker, a German by birth and a very intelligent man, gave the following history: His father had died at 56, of carcinoma of the stomach, and his mother at 39, of phthisis. He had one brother who was still living and in good health. He himself had, previous to his present disease, been perfectly well. He had never had any illness of moment. He had never drunk to excess and had never had any venereal disease. There was no history of injury or exposure.

On Christmas day of 1887 he was attacked with severe pains in the arms and shoulders. These were most marked on the insides of the arms and were burning and shooting in character. The parts became very painful on motion, but there was at no time any loss of power. Three or four days after the commencement of the attack he noticed distinct weakness of the thighs. He found that he could not raise them as readily as before. This weakness became more marked and rapidly spread down the legs to the feet and upward over the trunk as far as the breast. In the course of eight days he had become completely paralyzed. Both sphincters were involved. Hand in hand with this loss of power, numbness made its appearance and soon became profound. It involved both legs and the trunk up to the level of



the nipples. Pains had at no time been present in the legs. Anæsthesia, on the other hand, had never invaded the arms. The pain in the latter which had characterized the beginning of the affection gradually subsided and at the end of three weeks had disappeared. For three months following, no new symptoms had made their appearance. At the end of this time, however, he began to notice a constricting pain at about the level of the nipples. A little later also a small bed-sore formed over the lower portion of the sacrum. The girdle pain gradually grew more intense and caused him much suffering. His general health, too, became more and more impaired. He remained in this condition until October 1, 1888, when the following notes of his case were made:

Has complete paraplegia. All of the muscles, not only of the legs but also of the trunk as far up as the intercostals of the fourth or fifth interspace, if not higher, are paralyzed. This paralysis is absolute. The diaphragm is not involved. All of the reflexes, both deep and superficial, are much exaggerated. Ankle and patellar clonus, are not only present, but marked to an unusual degree. This also true of Sinkler's great toe reflex. The plantar and cremaster reflexes are also elicited with great ease and are unusually active. The legs are perfectly relaxed and flexible. Nothing suggestive of a spastic condition nor of contracture obtains, nor are there any clonic spasms. No marked wasting has taken place. Faradic irritability appears slightly increased.

Profound anæsthesia is found to exist everywhere over the paralyzed parts, both to touch and temperature. It ceases abruptly at the level of the second rib or slightly below it. Here a sharp line of demarcation can be made out running transversely over the chest and also over the back. It is readily traced except in the axillary region and is slightly irregular in its course. It is so sharp that a variation in the position of the pin point of but a quarter or even an eighth of an inch above or below it, determines the recognition or non-recognition of the impression by the patient. This line was also confirmed by means of a pointed faradic electrode though this gave a slightly lower level, due, doubtless, to the diffusion of the current. There is nowhere except, perhaps, in the axillæ, any shading from the sensitive into the anæsthetic areas.

A little below the level of this line the patient experiences an intense girdle pain. The position of this pain has not varied since its onset in the preceding April. It is slightly diffused, but appears to be most marked just below the third rib. It is further noted that slight blows

upon the head in the direction of the spinal axis are accompanied by a frightful exacerbation of this pain. On turning the patient on his face and gently percussing the spine, pain is elicited over the third and fourth vertebræ, and to a less extent over the fifth. Firm pressure also evokes the same symptoms. Flexion and torsion of the trunk also give rise to pain in this region.

In addition, both sphincters are paralyzed; fæcal evacuations take place without the patient's knowledge, and the urinal is worn constantly. A bed sore, some two by three inches in size, deep, sharply outlined and doubtless trophic, exists at the end of the sacrum.

No anæsthesia or paresis exists in the arms. A slight inequality of the pupils is noted, the left being slightly larger than its fellow.

The case as it now presented itself did not admit of an absolute diagnosis. The history of pain and paralysis suggested a myelitis, although the gradual diffusion of the paralysis from the thighs downward to the feet and upward over the trunk suggested an aberrant form of Landry's palsy. However, the symptoms elicited by transmitted and by direct blows upon the spinal column, as well as by flexion and torsion, pointed unmistakably to some localized affection of the spine or of its contents. Further, these symptoms received additional significance from the presence of the fixed girdle pain and the sharply demarcated anæsthesia.

The propriety of an exploratory operation at once suggested itself. Here we had a man who had been already some ten months in bed, who was suffering acutely and whose general condition had steadily grown worse. For him there was no hope of amelioration, much less of cure. The iodides and mercurials, had been thoroughly tried and had availed nothing. Accordingly, on October 8, I called a consultation of my colleagues, Drs. Mills, Sinkler and Lloyd. The propriety of an operation was freely discussed and unanimously concurred in. Our views were communicated to the patient, the uncertainty and danger being vividly placed before him. With little or no hesitation he consented, and at once, with philosophic equanimity, made all the necessary preparations for his demise.

Dr. J. William White was now requested to see the patient, advised the operation, and finally gave the sufferer the benefit of his skill on October 17. At my suggestion, Dr. White commenced by removing the spine and laminæ of the fifth dorsal vertebra. This, I am now convinced, was too low. The fragments of bone and the underlying tissue, including the external aspect of the dura, revealed nothing abnormal. Next, the corresponding parts of the fourth, third, second

and first dorsal vertebræ were removed. Nothing abnormal was anywhere detected except beneath the arches of the third dorsal vertebra, where the dura appeared hard and resistant. The cord, too, seemed to swell and rise up out of its bed. The significance of these features, however, was doubtful to us. Finally, it was decided to open the dura. This was done by a median incision some four inches in length. On everting the inner surface, to our great satisfaction, the dura was found to be intimately adherent to the subjacent pia by means of numerous fine bands of inflammatory tissue. Dr. White carefully separated these bands as far as accessible. The cord itself seemed normal. The wound was then closed.

The operation had occupied about an hour and a half. The patient reacted promptly. Five hours later, while still suffering from the after effects of the ether, he complained of great pain in his knees. This was a new symptom, and, as he expressed it, a reminder that he was really the possessor of a pair of knees. The pain was somewhat relieved by flexing the limbs. He also stated that the girdle pain of which he had so long and so persistently complained, had entirely disappeared.

On the following morning, October 18, he complained much of the pain in the knees and also of pain in the back and limbs. The remarkable fact was now demonstrated that there was a distinct return of sensation in the feet. He was not able, however, accurately to locate impressions, invariably fixing them much too high. Further, he presented the symptom of allocheiria, persistently referring every impression to the opposite limb.

On the following day, October 19, it was thought best not to disturb the patient by an examination.

On October 20 the following note was made: Up to this time the limbs have been perfectly relaxed. Now, however, the thighs are markedly adducted, and there is considerable resistance to passive movement. This, of course, is involuntary. When tested for sensation he now readily recognizes the touch of the hand, and accurately locates the impression when in the neighborhood of the right knee. There is no perceptible delay in the response in some areas and decided delay in others. The cutaneous sensibility is not, as yet, evenly distributed, and seems to have returned in patches. Further, the patient is very apt to locate the impression far too high; for instance, he describes a touch upon the ankle as having been made upon the knee, and a touch upon the toes to the middle of the foot. Sensation is best along the edges of the tibiæ, and quite poor or absent on the

outer and posterior aspects of the legs. The symptom of allocheiria is much less marked than at the previous examination, though it is still occasionally elicited. Out of four trials, for instance, he answers correctly three times, and at the fourth refers the impression to the opposite foot.

The reflexes appear to have undergone no change. On testing him with closed eyes, regarding his knowledge of the position of the limbs, he answers quite accurately, a condition not previously present. The girdle pain is still absent. The pain in the knees continues.

On October 23, on testing his sensation again, he remarked that the hand touching his feet was cold, which was true. The remark was unsolicited and entirely spontaneous. The responses of the various tests were still delayed here and there, and there was still considerable confusion in locating the impression. For instance, when a pencil point was placed on the inner aspect of the right leg he referred it to the outer aspect, and when it was placed over the middle third of the tibia he referred it to the foot. At other places, over the back of the feet, for example, the impressions were accurately located. Allocheiria was elicited now and then, but less readily than at previous examinations; thus, a touch upon the middle third of the inner aspect of the right leg was once referred to the corresponding region on the outer aspect of the left leg, and at another time a prick upon the inner aspect of the left leg was referred to the anterior tibial region of the right leg. Again when the great toe of the left foot was passively flexed, the patient claimed that it was the great toe of the right foot which had been moved. At another time when the great toe of the right foot was passively flexed the patient responded correctly.

He was now asked to concentrate his attention upon the toes of his left foot, and to make a strong effort to move them. The result was negative. He was then asked to do the same for his right foot, and it was thought by myself and the resident that an almost imperceptible movement in the toes resulted. However we were not certain.

On examining the reflexes, we discovered that upon the left side they were no longer as excessive as formerly. They had evidently undergone a diminution. Upon the right side they were unchanged.

On October 25, he distinctly moved the right great toe. In other respects there had been no marked change.

On November 1, the toes of both feet were repeatedly moved. There was also some slight improvement in sensation. The patient's general condition was also much better. On searching for the bed-sore, it was found to have completely healed, nothing but a small scar remaining.

Observations were now made from time to time, a general improvement, both as regards sensation and motion, being noted. By December he could distinctly move the feet and began to manifest some control over the muscles of the thighs, and finally became able to flex and extend both the legs and thighs to a considerable degree. Sensation also continued to increase in accuracy of location. Fewer errors were constantly being made. His improvement continued slowly but steadily throughout January of 1889. In February, hand in hand with this improvement, he had some return of pain in the chest. It was not the old girdle pain, but a new pain confined to the left side and more diffuse than the preceding, but attended by distinct tight or drawing sensations. It was less severe than before, and, he assures me, has at the present time, April 13, largely disappeared.

On being questioned regarding the sphincters he says that he is now conscious of every movement of the bowels, that he can always inform the nurse in time to keep himself from being soiled, and at times he thinks he can slightly control them. Regarding the bladder, his statements are more positive. He says that the urine no longer constantly dribbles from him, but that it accumulates in the bladder and is voided in bulk and at tolerably regular intervals; further, that he is always conscious of what is taking place, and that he always knows it beforehand and is positive that he has a number of times controlled the act. He is steadily increasing in strength. The movements of the legs, though leaving much to be desired, are evidently gaining in power, while the muscles of the trunk seem almost completely restored. He now sits up daily in a chair for three or four hours. His sensation is almost up to normal. He accurately separates the points of the æsthesiometer in all but a few areas. His responses are immediate and for the most part given with assurance.

It should also be related that the original girdle pain which disappeared so promptly after the operation never recurred, nor was it possible at any time to produce pain by transmitted shock nor by forced movements of the column.

In looking back over the case, it is undeniable that the improvement is directly due to the operative interference, whatever the lesion of the cord may have been. It is extremely probable that the evidences of internal pachymeningitis observed at the time of the operation were but secondary to some other process, and it is further probable that the operation did not extend sufficiently high. It certainly would have been well to have included the 6th and 7th cervical vertebræ, though the unanimous opinions of those present was that the

operation had been as extensive and as thorough as the strength of the patient would permit.

As it is, the return of function, especially the almost immediate return of sensation, and the immediate relief of girdle pain, point to the relief of pressure. Further, it should be stated, no attempt was made with instruments to explore the anterior aspect of the cord.

SURGICAL MEMORANDA, BY DR. WHITE.

In the case of C. K. the patient was prepared for operation by the administration of a saline purgative on the previous day, followed by an enema on the morning of operation. Five or six hours before my arrival at the hospital the skin of the upper dorsal region was washed with soap and hot water, then with alcohol, and finally with a solution of 1:20 carbolic in 1:500 bichloride, after which it was covered with cloths wet in the same solution. At the time of operation the patient was etherized in an adjoining room and was then placed upon the operating table in a semi-prone position, a small flat pillow under the sternum serving to throw out and make prominent the dorsal spinous processes. An incision beginning a short distance above the spine of the vertebra prominens was carried down for about seven inches in the median line, going directly to the bones and extending below the level of the sixth dorsal spine. The ligamentous attachments and the muscular masses occupying the vertebral gutter on the right side were then rapidly separated with the edge of the knife and the bones cleared with a curved periosteal elevator. A few large muscular branches were caught with hæmostatic forceps, and the wound was packed with sponges wrung out of hot bichloride solution. The opposite side of the spine was then treated in a similar manner. Small flat rectangular retractors with blunt serrated edges were then used to separate widely the sides of the wound, no transverse division of the deep fascia being found necessary. The spinous processes of the 4th and 5th dorsal vertebræ were then divided at their bases with powerful bone forceps, set at an obtuse angle and were removed, greatly enlarging the field of operation. With similar forceps set at a still larger angle—nearly straight—the lamellæ of the 5th dorsal were then cut through by small “bites” first on one side, then on the other, and as near as possible to the transverse processes, after which the attachments of the vertebra to the 4th and 6th were divided by the same forceps cutting transversely to the axis of the spinal column. The loose portion of bone was then seized with lion forceps and separated from its attachment on the

under surface first by a few touches of the knife and then by the use of scissors curved on the flat. This exposed the posterior surface of the dura which was quite intact, and even gave room for the gentle exploration of the lateral and antero-lateral aspects of the cord with the tip of the little finger. The spines and lamellæ of the 4th, 3d, 2nd, and 1st dorsal vertebræ were successively and easily removed in the same manner. At Dr. Dercum's request, I then picked up the dura with a pair of fine-toothed forceps, nicked it, and with scissors divided it in the median line to the full length of the incision. It was found at places, and particularly toward the upper angle of the wound, to be very adherent by new fibrous tissue to the subjacent membranes and cord and was separated with some little difficulty. Exploration with the finger, which could be passed well toward the anterior surface of the cord, revealed nothing abnormal. As enough of the cord had been exposed, in the opinion of Dr. Dercum, Dr. Mills, Dr. Lloyd, Dr. Sinkler and the other neurologists, present to cover the area supposed to be implicated, I then proceeded to close the wound. The dura was stitched by interrupted catgut sutures introduced at intervals of about one third to one quarter of an inch by means of long handled staphyloraphy needles. A medium sized rubber drainage tube was then laid in the wound, its ends projecting at each extremity. The muscles, including the deep fascia, were then brought together by chromicized catgut stitches and the skin and subcutaneous structures by silver wire. The wound was dusted with iodoform, covered with protective and then with bichloride dressings held in place by an antiseptic roller applied as a circular of the chest and a posterior figure-of-eight. There was a moderate amount of shock, but the patient soon rallied.

Surgically the subsequent course of the case was uneventful. Free oozing with escape of cerebro-spinal fluid necessitated a daily change of the dressings for several days, after which it was dressed at much longer intervals. The tube was shortened by drawing it out at the lower angle of the wound on the 5th day, and was withdrawn completely on the 10th day. There was great pain on the second day after the operation and considerable discomfort for three or four days later, referred to the back and legs.

There was almost no fever; with the exception of one day—the 11th—when it suddenly rose to 103° . It never went above 100° . On that occasion it was found to be due to obstinate constipation and fell permanently after the use of purgatives and quinine. The deep portions of the wound healed in about two weeks, but the skin edges were separated by the bad practice of some of the attendants who raised the

patient in bed, when it became necessary to wash and change him, by drawing on the arms, thus forcibly separating the scapulæ, and with them the wound. This, however, granulated promptly and nicely, and union was complete in a little more than three weeks.

There were no complications of any sort whatever and at no time, so far as the operation was concerned, was the patient's condition one that could justify anxiety.

NEUROLOGICAL MEMORANDA, BY DR. DERCUM.

CASE II.—J. G., æt. 23 years, a laborer, an Irishman by birth, gave the following history: His mother had died at middle age; cause of death unknown. His father was living, as were also his brothers and sisters. As far as he knew, they were in good health. He himself had never had any other disease than measles in childhood.

One year and four months ago he commenced to have pain across the small of the back. It was a dull ache and seemed to spread from the spine along the region of the false ribs on either side, being worse on the left. Little by little he noticed that he could not run or walk as well as before, and also when he rested his foot against a chair, as in the act of lacing his shoes, that his leg commenced to shake to and fro. If he stood for any length of time the pain in his back would grow worse and his legs would get stiff. Did not notice that they grew cold. In March, 1888, he was admitted to the Philadelphia hospital with pneumonia of the right lung. His convalescence was very prolonged. He was in bed two months, during which time he noticed frequent trembling of the limbs and on attempting to stand the vibration became excessive. These symptoms became more and more pronounced during the convalescence from the pneumonia. For about two weeks after leaving his bed he walked about the ward with the aid of a cane. At the end of this time walking was impossible. The loss of power had, however, been gradual. Finally, it became absolute and he could no longer move the legs even in bed. His last successful effort consisted in moving the toes, but this he had not accomplished for some two or three months.

At the time of the examination complete paralysis of all the muscles of the lower extremities existed. The abdominal muscles were possibly parietic but not decidedly so.

The myotatic condition was now studied. *a, Body prone.* Percussion over the trapezius, the rhomboid, the latissimus, the scapular and the quadrate muscles yielded no response. Slight responses

were elicited in the gluteus maximus and gastrocnemius of either side. Percussion of the ham strings tendons provoked faint contraction of the corresponding muscles. Percussion of the tendo achillis provoked marked contraction of gastrocnemius. Percussion of the plantar fascia elicited flexion of all the toes, more marked in the right foot. The responses, as a rule, were more marked on the right side.

At the level of the twelfth dorsal vertebra and below it, superficial reflexes could readily be evoked; not, however, in the lumbar muscles. In all of the muscles, too, of the buttocks, back of thighs and back of legs most extensive reflexes could be evoked by stroking the overlying or neighboring skin.

On attempting gradual flexion of the leg upon the thigh a slight resistance was experienced. Rapid flexion elicited a faint clonus of the gluteal and ham-string muscles. In the right leg these features were more marked.

The following curious reflex was also developed. The patient, it should be remembered, was still lying prone. If now the foot was rapidly extended and then released, the leg would at once be flexed upon the thigh. This phenomenon resembled Sinkler's toe reflex in character, but the movement was altogether different. The toes were not grasped by the hand, simply the metatarsus and tarsus, and, moreover, the quadriceps extensor took no part in the response. It was more marked on the right side.

b. Bodysupine. Percussion of the pectorals elicited a slight, normal response. The recti responded very vigorously, especially the middle and lower portions. The quadriceps yielded vigorous responses on both sides. The adductors of the thighs yielded a slight response, while the extensor group of either leg yielded a very decided response.

Knee jerk and ankle clonus both very excessive. Sinkler's toe reflex very marked.

No response to stroking the skin over the pectorals. Very vigorous response on stroking the skin over the abdominal muscles and the extensors of the thighs. Cremaster reflex also elicited, but not excessive.

There was never any paralysis of the sphincters. Bladder and rectum were under perfect control.

Cutaneous sensibility was comparatively well preserved. The responses were prompt in all portions of the trunk. Over the inner aspects of the thighs and of both the inner and outer aspects of the legs the responses were slightly delayed. Separation of the points a little below normal in the legs and feet, more marked toward the feet. On

the feet, too, the patient makes frequent errors of location. However, nowhere can actual anæsthesia be demonstrated.

It remains further to state that a slight prominence existed over the region of the 10th and 11th dorsal vertebræ. Tubercular disease was suspected. Dr. John Musser, under whose care the patient had been, informed me that no elevation of temperature had occurred for several weeks past. Syphilis was denied. Dr. J. Wm. White likewise saw this patient and concurred in the propriety of an operation. To this the patient submitted on December 12, 1888. The 9th, 10th and 11th dorsal spines and arches were removed. The dura was not touched.

Though the surgical interference was much less extensive than in the preceding case the patient died thirty hours after the operation.

AUTOPSY.—Eighteen hours after death general appearance, that of a man of fine physical development. Muscles large, chest well shaped. Not much superficial fat.

Thorax.—Visceral and parietal pleura united by numerous bands of old adhesions, most extensive on right side. Patch of softened tissue, size of egg, in posterior portion of lower lobe of right lung. Pleura especially adherent at this point. Minute tubercles scattered through both lungs. Bronchial glands caseous.

Pericardium normal. Heart muscle pale and soft; valves normal.

Abdomen.—Nothing worthy of note, except amyloid changes in both kidneys.

Spinal Column.—Both thoracic and abdominal viscera having been removed, extensive tubercular disease of both dorsal and lumbar vertebræ was noted. On the right side in the thoracic region was observed a tuberculous mass which had evidently been adherent to the patch of softened lung tissue noted above.

Cadaver prone: Surgical wound reopened; aspect of wound healthy. No effusion of serum or blood. Dura unchanged. Spinal canal now opened to full extent. Dura and peri-dural tissues everywhere normal. Dura opened entire length. Cerebro-spinal fluid normal in color and quantity. Appearance of cord, normal, except at level of 11th dorsal vertebra. Here it is undoubtedly soft. Above and below the consistence of the cord does not appear to have changed. Immediately above the site of operation a minute extravasation of blood is noted. Cauda equina healthy.

A section of cord one inch in depth was now removed, the upper portion of the section corresponding to the area of softening.

Cranium unopened.

Microscopical Examination of Cord.—This proved to be exceedingly interesting, especially in view of the conclusions of many surgeons and neurologists recently formulated by Elliott, who argues against the occurrence, at least the frequent occurrence of inflammation of the cord as a result of compression in Pott's disease.¹ In the first place the cord shows no alteration in shape, nor does there appear to be any change in the pia mater. A very striking change, however, exists in the gray matter. Here extensive hæmorrhagic infiltration has taken place. It is marked on both sides, but especially so on the left; nor is it absolutely confined to the gray matter; here and there the white matter has been invaded. It is of interest to note that



FIG. 1.—TRANSECTION OF LUMBAR CORD, SHOWING HÆMORRHAGIC INFARCT.
(Drawn by Allen J. Smith).

this condition is relatively recent. The stage is still that of *red* softening, and little, if any, change has taken place in the blood-corpuscles. If we seek for indications of long standing and chronic inflammatory changes we fail to find them. In the cornua of the gray matter, the nerve cells are quite well preserved; the nerve tubules of the white matter likewise present a normal appearance, and we do not find any noticeable increase in the neuroglia. Further it is most marked in sections made from the upper portion of the fragment, namely, that which had undergone most compression.

It is not at all improbable that the long continued and unavoidable administration of the anæsthetic played a part

¹See New York Med. Journal, June 2, 1888, p. 589. The Pressure Paralysis of Pott's Disease, by Geo. R. Elliott.

in bringing about a fatal termination of the case. The pathological findings in the case point to an earlier operation. Had the operation in the present case been undertaken but a few weeks earlier it is doubtful whether the cord would have presented any pathological changes whatever. These considerations, it seems to us, are very important, affecting as they do the possibility of recovery from the paraplegia.

Had it been possible to determine in advance the extensive tubercular degeneration of the vertebræ, it would no doubt have weighed against the advisability of the operation. However, the absence of changes in temperature, the well-nourished and apparently good condition of the man decided the question in the affirmative. Further, though the vertebral disease was extensive, the amount of deformity was very slight.

Surgical Memoranda, by Dr. White.—It is not necessary to repeat in this case the details of the operative procedure which were precisely the same as in the previous one. The result was a surprise and great disappointment to me. So much less interference with both bony and nervous structures had occurred; the patient was so much younger; his general appearance was so good and his nutrition so excellent that my prognosis, based also on the reports of the attending physicians and neurologists, was very favorable, as regarded the immediate effects of the operation. The autopsy, of course, disclosed a hopeless condition, or rather series of conditions, that went far both to explain the fatal result, and to render it less distressing, as the case was evidently a hopeless one. Either the spinal abscess or the pulmonary tubercle would have strongly contraindicated operation had their existence been revealed by persistent fever or sweats, by cough or emaciation, or by physical signs. In the absence, however, of these, and of all other significant symptoms, and in the presence of a spinal deformity which seemed to point strongly to a pressure paraplegia, the operation seemed justifiable.

The immediate cause of death, I am disposed to believe, was a combination of shock with the free use of ether in a patient with crippled lung power, a degenerated heart muscle and amyloid kidneys. There was no hæmorrhage of any moment, and indeed, the quantity of ether administered was not exces-

sive as compared with that used in every-day operations on ordinary patients.

The chief lessons of the case are: 1. The apparently unavoidable risk due to insidious and unrecognizable complications, a risk which is probably greatly increased in tuberculous patients. 2. The existence of red softening in a case of Pott's paralysis, a condition which, if we can judge by recorded autopsies and by the expressed opinion of many competent observers is more or less exceptional. 3. The necessity for extreme caution in the use of anæsthetics in all cases in which the existing and recognized disease makes coincident visceral changes probable, or even possible.

I append the notes of my resident, Dr. Dalley, and desire to call especial attention to the remarkable difference in temperature between the mouth, the surface and the rectum.

CLINICAL NOTES.

1 P.M. Patient complained of being cold; ordered blankets, hot cans and whisky \mathfrak{Z}_{ss} , ammon. carb. gr. v., hot water \mathfrak{Zj} every half hour.

1:15. Temperature, 97.1° (rectum); pulse, —; respiration, 32; vomited matter of a dark brown color; whisky \mathfrak{M}_{xx} , tr. digitalis \mathfrak{M}_x , hypodermically.

1:30. Whisky \mathfrak{Z}_{ss} , ammon. carb. gr. v, given hot. Patient covered with cold perspiration; dressing slightly soiled with blood; complains of pain in heel.

2:00. Whisky \mathfrak{Z}_{ss} and ammon. carb. gr. v., hot. Complains of great pain in heel.

2:15. Temperature, 97.1° ; pulse, 138; respiration, 36. Soiled dressings show some oozing from wound. Feet quite warm and are losing their blue color.

2:30. Whisky \mathfrak{Z}_{ss} , ammon. carb. gr. v, hot. The pain has extended to the calf of leg. Also complains of stinging pain on inside of legs.

3:00. Whisky \mathfrak{Z}_{ss} , ammon. carb. gr. v.

3:15. Temperature, 97.2° ; pulse, 136; respiration, 34. Pain in knee is complained of.

4:30. Whisky \mathfrak{Z}_{ss} , ammon. carb. gr. v. Patient vomiting.

4:45. Whisky \mathfrak{Zij} , ammon. carb. gr. ijss, every fifteen minutes. Vomited.

5:00. Whisky \mathfrak{M}_{xxv} , tr. digitalis \mathfrak{M}_v , hypodermically.

5:30. Temperature—rectum, 102° ; mouth, 95.3° ; axilla, 98° . Whisky and ammon. carb.

5:45. Whisky and ammon. carb. Patient still vomiting.

6:00. Temperature—rectum, 102.8° ; mouth, 94° ; axilla, 99° .

7:00. Temperature (rectum), 99.4° . Still vomiting.

8:00. Temperature—rectum, 100.3° ; axilla, 99.1° ; surface (calf), 95.2° ; chest, 97.3° .

9:00. Temperature—rectum, 101.3° ; axilla, 98.2° ; surface (chest), 97° ; pulse, 82, feeble; respiration, 36. Repeated vomiting.

10:00. Temperature—rectum, 101°; axilla, 99.4°; mouth, 95°; surface, 97.3°; pulse, 100; respiration, 34. Still vomiting and complains of great thirst. Hypodermic injection of whisky and digitalis. Catheterized at 10:30, and about $\frac{3}{3}$ urine drawn off.

11:00. Temperature—rectum, 101.4°; axilla, 100°; mouth, 95°; surface, 97.3°; respiration, 36. Still vomiting. Slept twenty minutes.

12:00. Temperature—rectum, 104°; axilla, 99.2°; mouth, 94°; surface, 95.3; respiration, 34. Whisky and ammon. carb. by mouth, followed by vomiting. Hypodermically, whisky and digitalis. Complained of pain in leg.

1 A M. Temperature—rectum, 103.4°; axilla, 100.1°; mouth, 94°; surface, 96.3°; pulse, 98; respiration, 33. Vomiting brown fluid. Cocaine gr. $\frac{1}{4}$, followed by wine $\frac{3}{4}$ ij, which was immediately vomited. Patient perspiring. Slept fifteen minutes.

2:00. Temperature—rectum, 103.2°; axilla, 99.2°; mouth, 94°; surface, 96°; respiration, 38. Still vomiting. Cocaine gr. $\frac{1}{4}$, followed by ammon. carb. gr. v, which was retained. Slept fifteen minutes.

3:00. Temperature—rectum, 101.4°; axilla, 100.1°, mouth, 94°; surface, 95.4°; pulse, 116; respiration, 37. Cocaine gr. $\frac{1}{4}$, followed by ammon. carb. gr. v. Slept fifteen minutes. Warm milk $\frac{3}{4}$ ss vomited.

4:00. Temperature—rectum, 103.4°; axilla, 98.3°; mouth, 94°; surface, 95.4°; respiration, 40. Cocaine, gr. $\frac{1}{4}$, followed by ammon. carb. gr. v, which was retained.

5:00. Temperature—rectum, 103.4°; axilla, 101.2°; mouth, 94°; surface, 95°; pulse, 80; respiration, 37. Ears cold. Slept thirty minutes. Vomited.

6:25. Temperature—rectum, 101.1°; axilla, 98.2°; mouth, 94°; surface, 94.6°; respiration, 34. Ammon. carb. gr. v, vomited. Color of vomited matter dark brown.

7:25. Temperature—rectum, 101.4°; axilla, 100°; mouth, 64°; surface (chest), 95.2°; (thigh), 96°. Still vomiting.

8:45. Temperature—rectum, 102°; axilla, 100.1°; mouth, 95.1°; surface, chest, 95.1°, thigh, 95.4°.

10:00. Temperature—rectum, 103.4°; axilla, 100°; mouth, 95°; surface, 97.1°; pulse, 80; respiration, 38. Vomiting frequently.

11:00. Temperature—rectum, 104°; axilla, 100.2°; mouth, 94.4°; surface, leg, 94°, abdomen, 97.3. Hypodermic injection, whisky and digitalis.

12:40 P.M. Enema. Whisky $\frac{3}{4}$ ss, peptonized milk $\frac{3}{4}$ ij.

12:50. Hypodermic injection, whisky \mathfrak{M} xxv, digitalis \mathfrak{M} v.

1:35. Hypodermically, whisky and digitalis.

1:45. Temperature—rectum, 104°; axilla, 101.4°; mouth, 94°; surface, leg, 99.1°, abdomen, 99.1°.

1:55. Mustard plaster to epigastrium.

2:30. Hypodermic injection of whisky and digitalis.

2:45. Plaster removed. Vomiting relieved. Enema. Peptonized milk and whisky.

2:50. Slept ten minutes. No nausea. Respiration 40 while asleep.

3:15. Vomited.

3:45. Temperature—rectum, 104.3°; axilla, 102.1°; mouth, 95°.

4:25. Hypodermic injection of whisky \mathfrak{M} xxv, digitalis \mathfrak{M} v, atropia gr. $\frac{1}{100}$.

5:45. Face dry; forehead and neck warm, cheeks and chin still cold; tongue moist; very restless; severe dyspnœa; pupils moderately dilated. Hypodermically, whisky, digitalis and atropia gr. $\frac{1}{100}$. While under observation dyspnœa became more intense and patient died at 6 P.M.



